

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A two-phase cooling apparatus for cooling an electronic assembly located on a testhead, the apparatus comprising:

an evaporator coupled to the electronic assembly that is located on the testhead, the evaporator having a single-phase inlet for receiving a single-phase liquid coolant and a two-phase outlet for discharging a two-phase coolant;

a ~~heat~~ condenser disposed ~~proximate~~ on the electronic assembly with the evaporator and having a two-phase inlet coupled to the evaporator outlet, the ~~heat~~ condenser including a single-phase liquid coolant outlet; and

a pump having an output coupled to the evaporator inlet, and an input coupled to the ~~heat~~ condenser outlet.

2. (Currently Amended) A two-phase cooling apparatus according to claim 1 wherein:

the pump comprises a ~~heat~~ pump disposed ~~proximate the evaporator inlet off of~~ the testhead, the testhead, evaporator and condenser being in movable relation to the pump.

3. (Currently Amended) A two-phase cooling apparatus according to claim 1 and further comprising:

a single-phase liquid coolant inlet line extending from off of the testhead onto the testhead and coupled to the evaporator inlet; and

a single-phase liquid coolant outlet line extending from on the testhead to off of the testhead and coupled to the ~~heat~~ condenser outlet.

4. (Withdrawn) A two-phase cooling apparatus according to claim 3 and further comprising:

at least one single-phase coolant path disposed in parallel with the evaporator and condenser for carrying out single-phase heat transfer.

5. (Currently Amended) A method of cooling an electronic assembly, the method comprising the steps:

pumping a single-phase liquid coolant onto a testhead and onto the electronic assembly located on the testhead;

exchanging heat proximate a first electronic device on the electronic assembly with the single-phase liquid coolant, and evaporating a portion of the single-phase liquid coolant to form a two-phase coolant;

condensing the two-phase coolant back to a single-phase liquid coolant; and
routing the condensed single-phase liquid coolant off the electronic assembly and the testhead.

6. (Original) A method according to claim 5 and further comprising the step:

directing a portion of the single phase coolant proximate a second electronic device on the electronic assembly to effect single phase cooling for the second electronic device.

7. (Currently Amended) A two-phase cooling apparatus for cooling an electronic assembly, the apparatus comprising:

an evaporator located on a testhead and having a single-phase inlet for receiving a single-phase liquid coolant and a two-phase outlet for discharging a two-phase coolant;

means for condensing the two-phase coolant to a single-phase coolant, the means for condensing disposed on the electronic assembly on the testhead; and

a ~~remote~~ pump not disposed on the electronic assembly and having an output coupled to the evaporator inlet, and an input coupled to the means for condensing.

8. (Currently Amended) A two-phase cooling apparatus according to claim 7 wherein the means for condensing comprises:

a local condenser disposed on the testhead ~~proximate the evaporator~~ and having a two-phase inlet coupled to the evaporator outlet, the local condenser including a single-phase liquid coolant outlet.

9. (Withdrawn) A two-phase cooling apparatus according to claim 7 wherein the means for condensing comprises:

a single-phase coolant path disposed in parallel with the evaporator, the single-phase coolant path coupled to the evaporator outlet to mix sufficient single-phase coolant with the two-phase coolant and condense the two-phase coolant to a single-phase coolant.

10. (Currently Amended) A two-phase cooling apparatus for cooling an electronic assembly, the apparatus comprising:

means for pumping a single-phase liquid coolant onto a testhead and onto the electronic assembly;

means for exchanging heat proximate an electronic device on the electronic assembly with the single-phase liquid coolant, and evaporating a portion of the single-phase liquid coolant to form a two-phase coolant;

means for condensing the two-phase coolant back to a single-phase liquid coolant;
and

means for routing the condensed single-phase liquid coolant off the electronic assembly and the testhead.

11. (Original) A two-phase cooling apparatus according to claim 10 and further comprising:

means for directing a portion of the single phase coolant proximate a second electronic device on the electronic assembly to effect single phase cooling for the second electronic device.

12. (Currently Amended) A two-phase cooling apparatus according to claim 10 wherein the means for pumping comprises a ~~remote~~ pump not located on the electronic assembly.

13. (Currently Amended) A two-phase cooling apparatus according to claim 10 wherein the means for pumping comprises a ~~local~~ pump ~~disposed proximate the means for exchanging heat off of the testhead, the testhead, evaporator and condenser being in movable relation to the~~ pump.

14. (Original) A two-phase cooling apparatus according to claim 10 wherein the means for exchanging heat comprises an evaporator having a single-phase inlet for receiving a single-phase liquid coolant, and a two-phase coolant outlet.

15. (Currently Amended) A two-phase cooling apparatus according to claim 10 wherein the means for condensing comprises a ~~local~~ condenser disposed ~~proximate the means for exchanging heat~~ on the electronic assembly and having a two-phase inlet coupled to the means for exchanging heat, the ~~local~~ condenser including a single-phase liquid coolant outlet.

16. (Currently Amended) A two-phase cooling system for cooling a plurality of electronic assemblies in a semiconductor tester having a mobile testhead, the two-phase cooling system comprising:

a liquid pump having an inlet and an outlet;

an inlet manifold coupled to the pump outlet;

a plurality of cooling assemblies located on the mobile testhead and having respective inlets coupled to the inlet manifold, each of the cooling assemblies including

an evaporator corresponding to an electronic assembly of the plurality of electronic assemblies with having a single-phase inlet coupled to the cooling assembly inlet for receiving a single-phase liquid coolant and a two-phase outlet for discharging a two-phase coolant; and

a ~~local~~ condenser disposed ~~proximate on the electronic assembly of the plurality of electronic assemblies with~~ the evaporator and having a two-phase inlet coupled to the evaporator outlet, the ~~local~~ condenser including a single-phase liquid coolant outlet;

an outlet manifold coupled to the cooling assembly outlets, the outlet manifold disposed in liquid communication with the liquid pump inlet.

17. (Currently Amended) A two-phase cooling apparatus according to claim 16 wherein:
the liquid pump comprises a ~~local~~ pump disposed ~~proximate the evaporator inlet off of the mobile testhead; and~~
the plurality of cooling assemblies, evaporator and condenser are in movable relation to the pump.

18. (Currently Amended) A two-phase cooling apparatus according to claim 16 and further comprising:
a single-phase liquid coolant inlet line coupled to each evaporator inlet; and
a single-phase liquid coolant outlet line coupled to each ~~local~~ condenser outlet.

19. (Withdrawn) A two-phase cooling apparatus according to claim 16 and further comprising:
at least one single-phase coolant path disposed in parallel with each evaporator and condenser for carrying out single-phase heat transfer.

20. (New) A two-phase cooling apparatus according to claim 1, wherein the electronic assembly is a circuit board.

21. (New) A two-phase cooling apparatus according to claim 1, further comprising a heat exchanger located off the testhead.

22. (New) A two-phase cooling apparatus according to claim 21, wherein the testhead provides six degree of freedom movement of the electronic assembly relative to the heat exchanger.

23. (New) A method according to claim 5 and further comprising the step:
inverting the testhead.

24. (New) A method according to claim 5, wherein the step of pumping includes pumping the single-phase liquid coolant into a cold plate attached to the first electronic device.

25. (New) A two-phase cooling apparatus according to claim 14, further comprising a heat exchanger fluidly coupled between the means for condensing and the evaporator and located off of the testhead.